

FIG. 1A

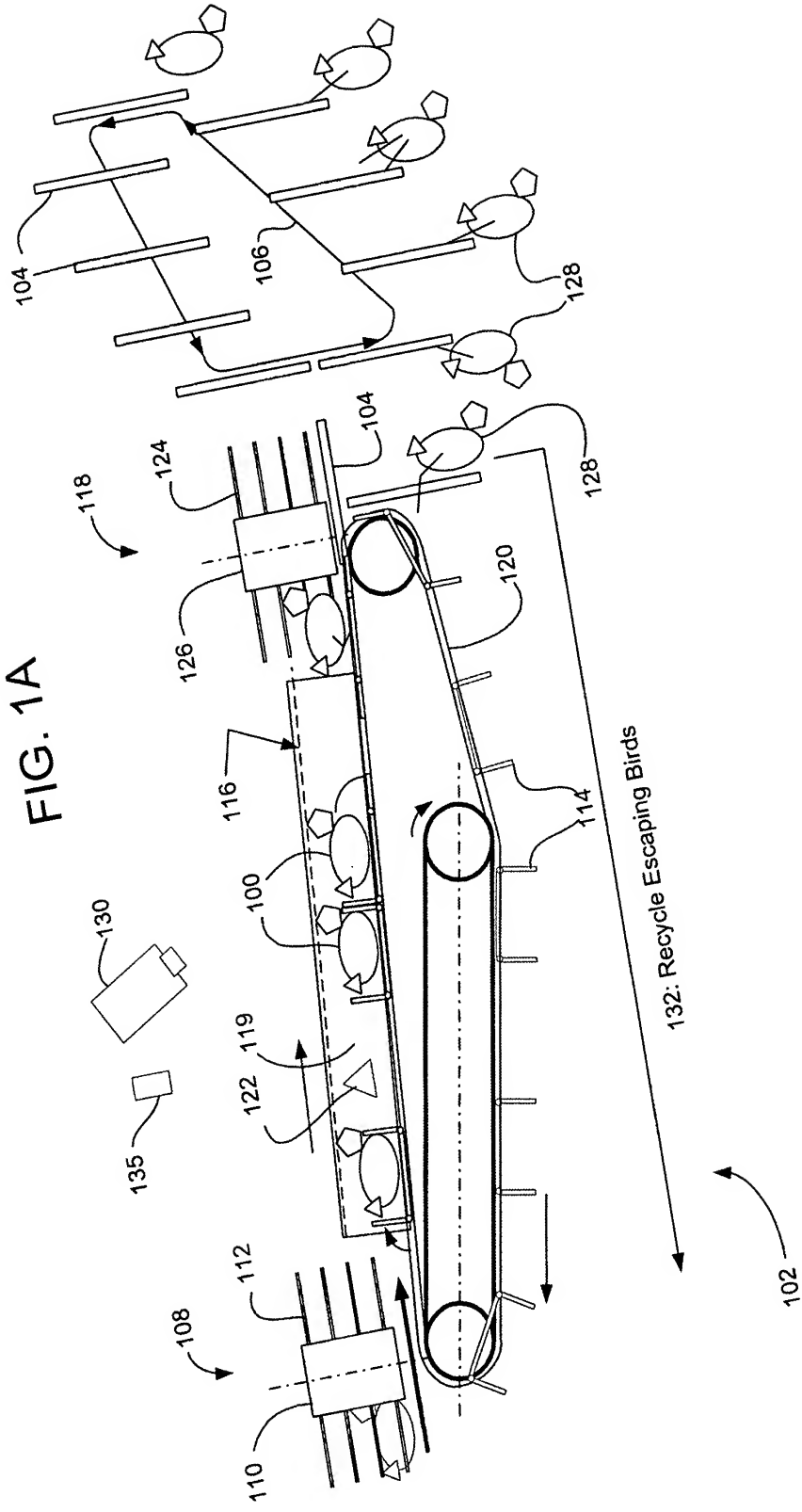


FIG. 1B

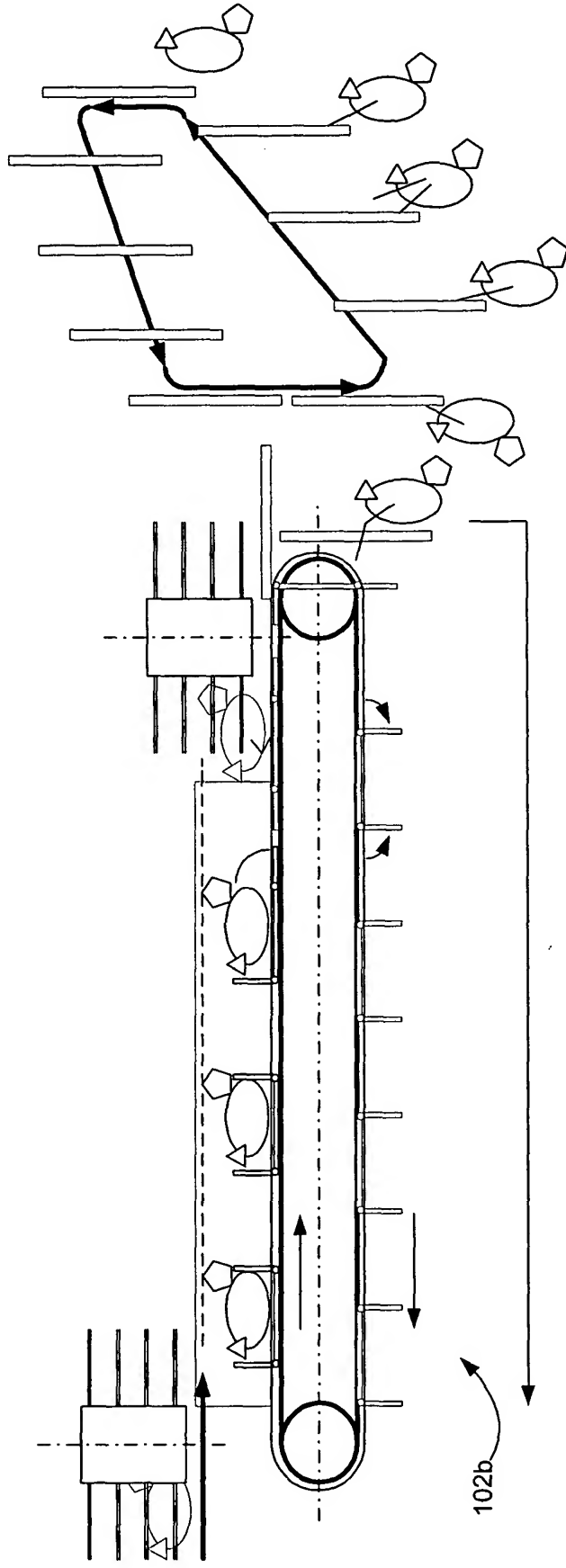


FIG. 1C

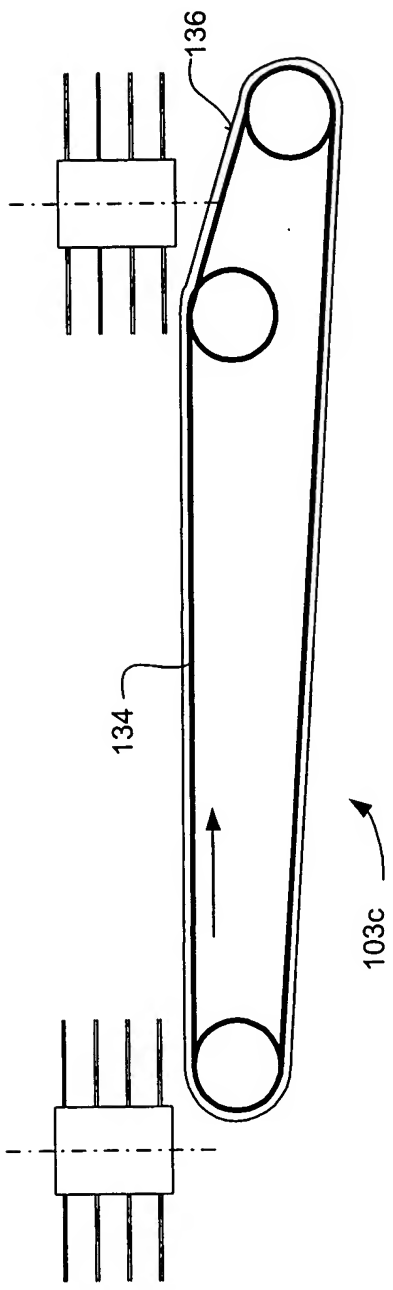


FIG. 2
Singulating System

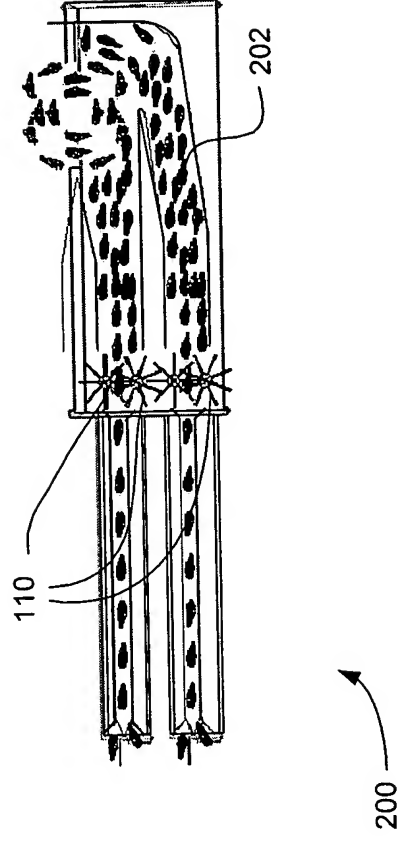


FIG. 3

Pallet

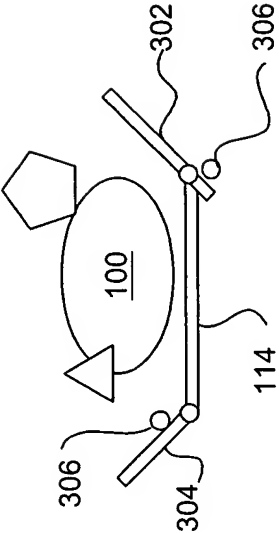


FIG. 4
Leg Gripping

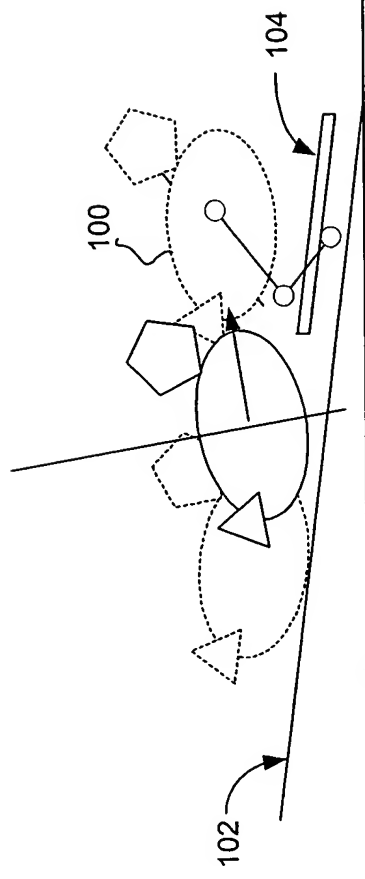


FIG. 5A
Shackle

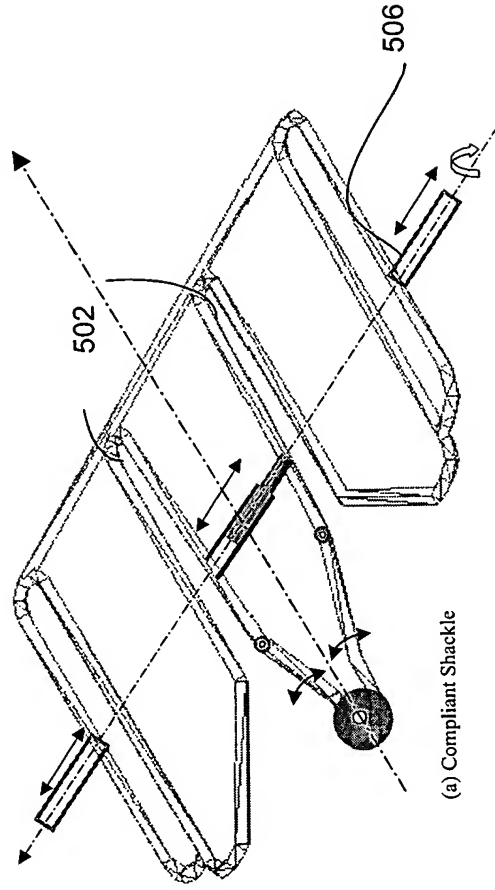


FIG. 5B
Awaiting Shackle

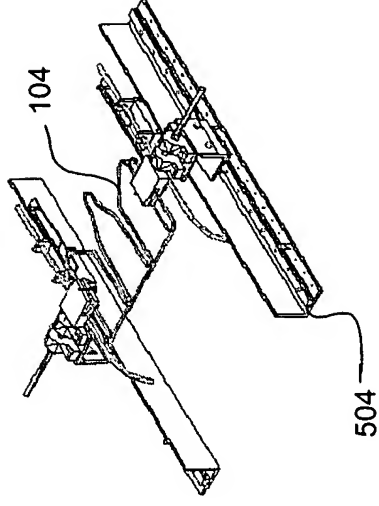


FIG. 5C
Rotated Shackle

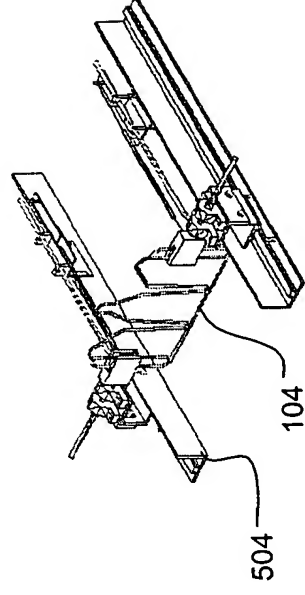


FIG. 6

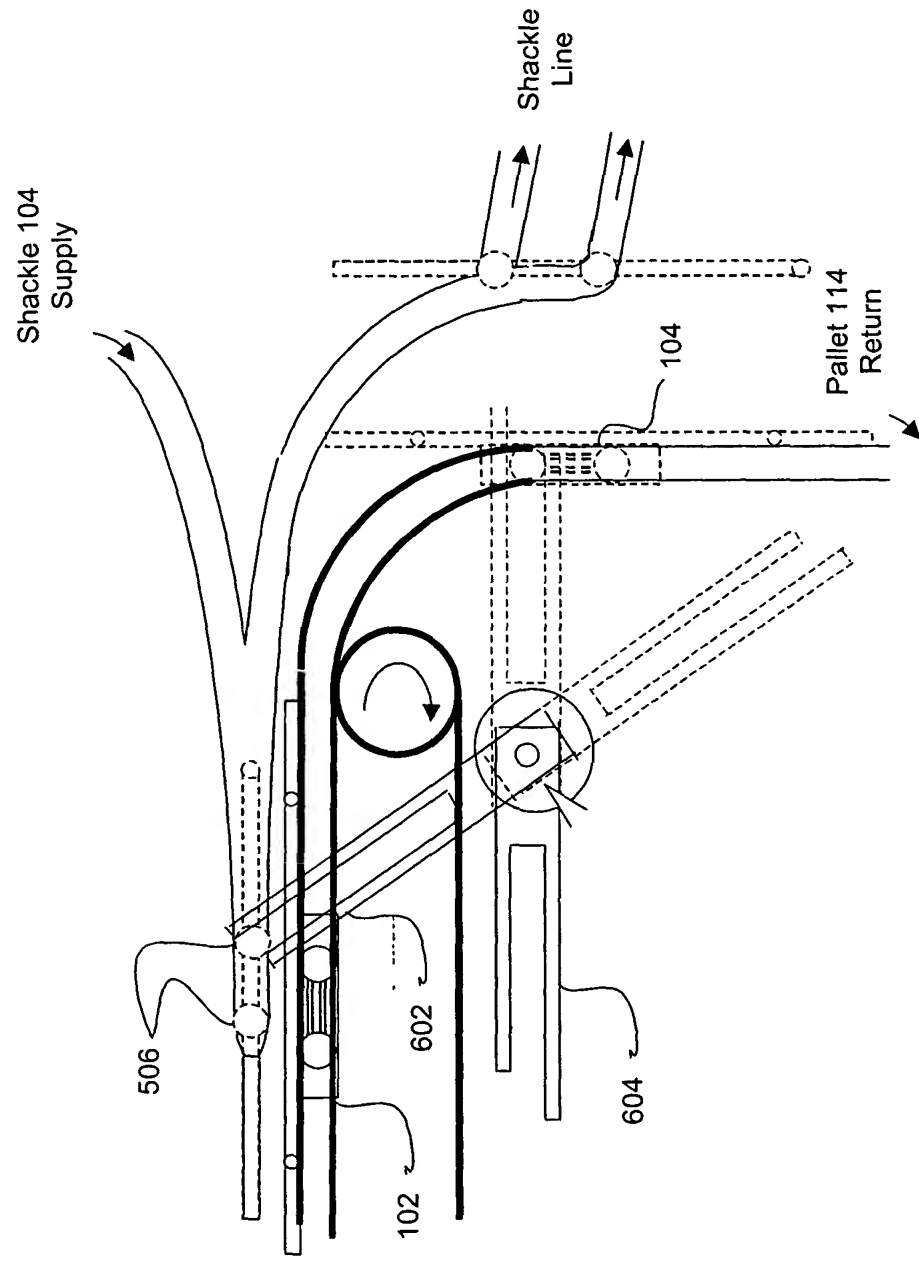


FIG. 7A

Imaging System

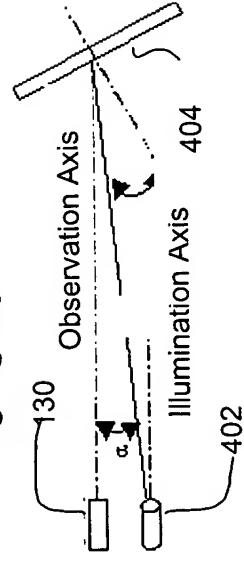


FIG. 7B
Imaging Neural
Network

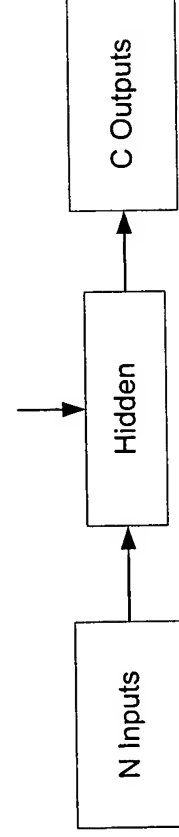


FIG. 7C
Imaging Neural
Network

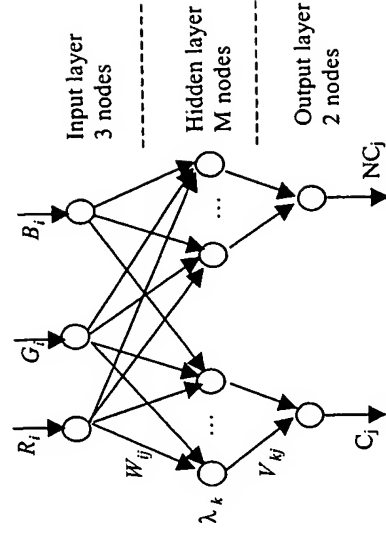


FIG. 8A
Plots for Use with
a Neural Network

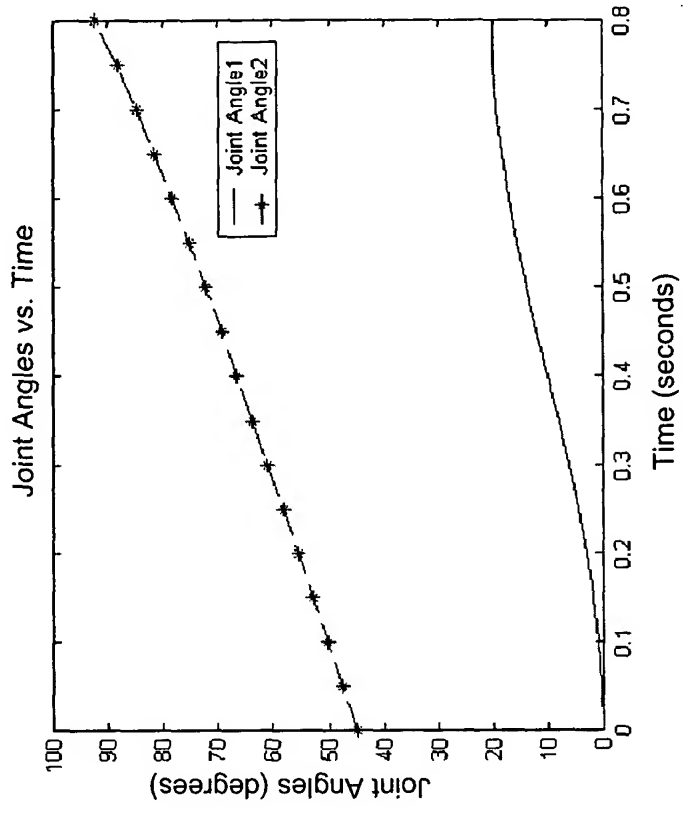
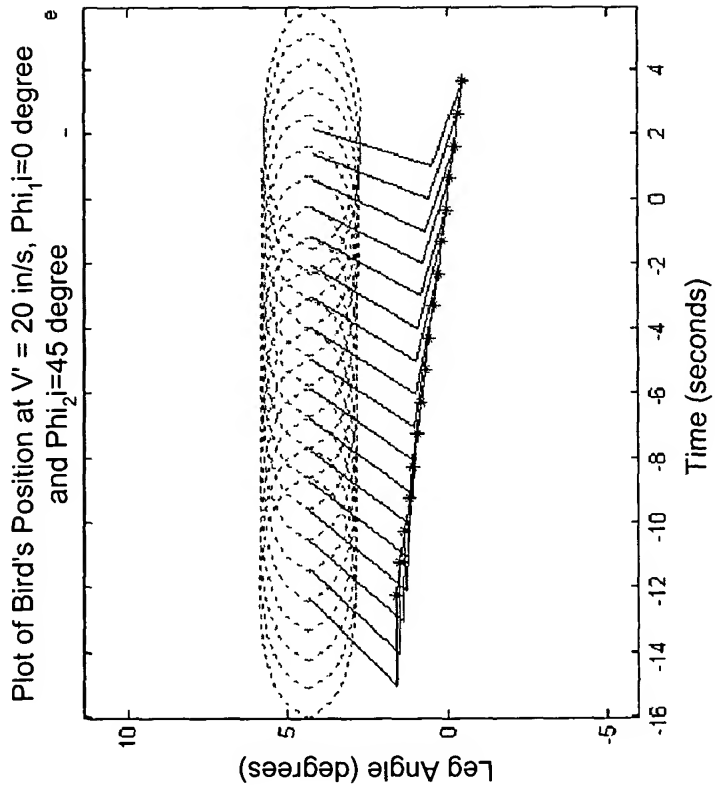


FIG. 8B
 Plots for Use with
 a Neural Network

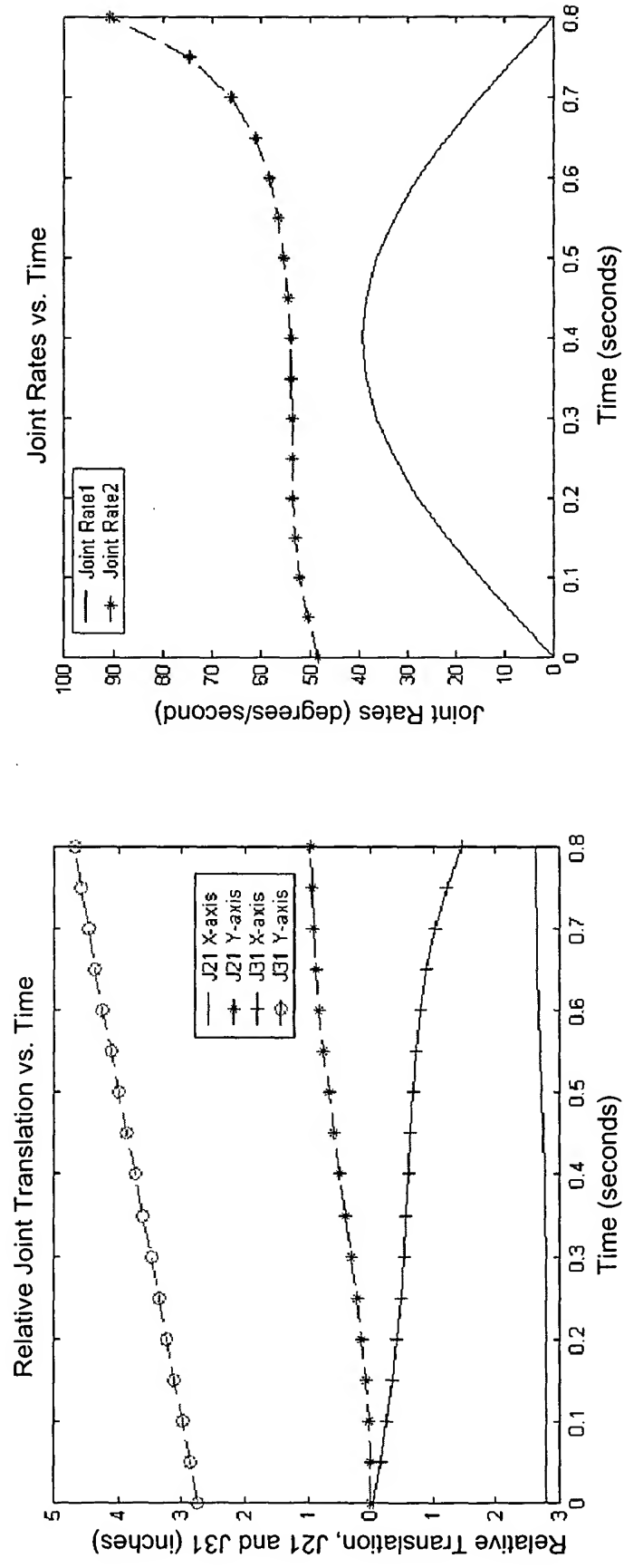


FIG. 8C
Plots for Use with
a Neural Network

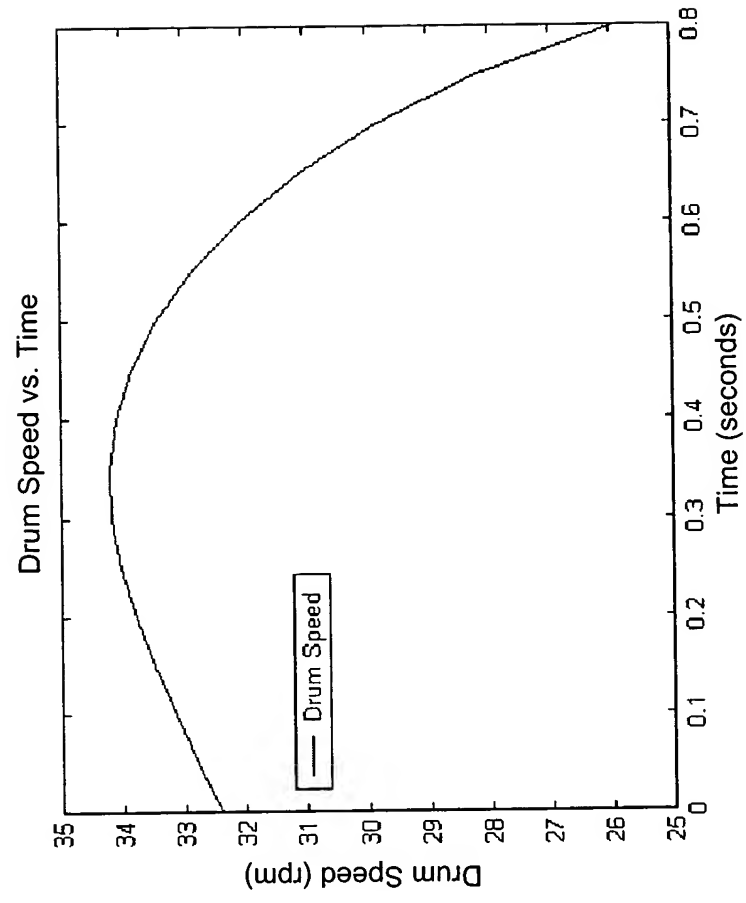


FIG. 9
System Operation Control Sequence

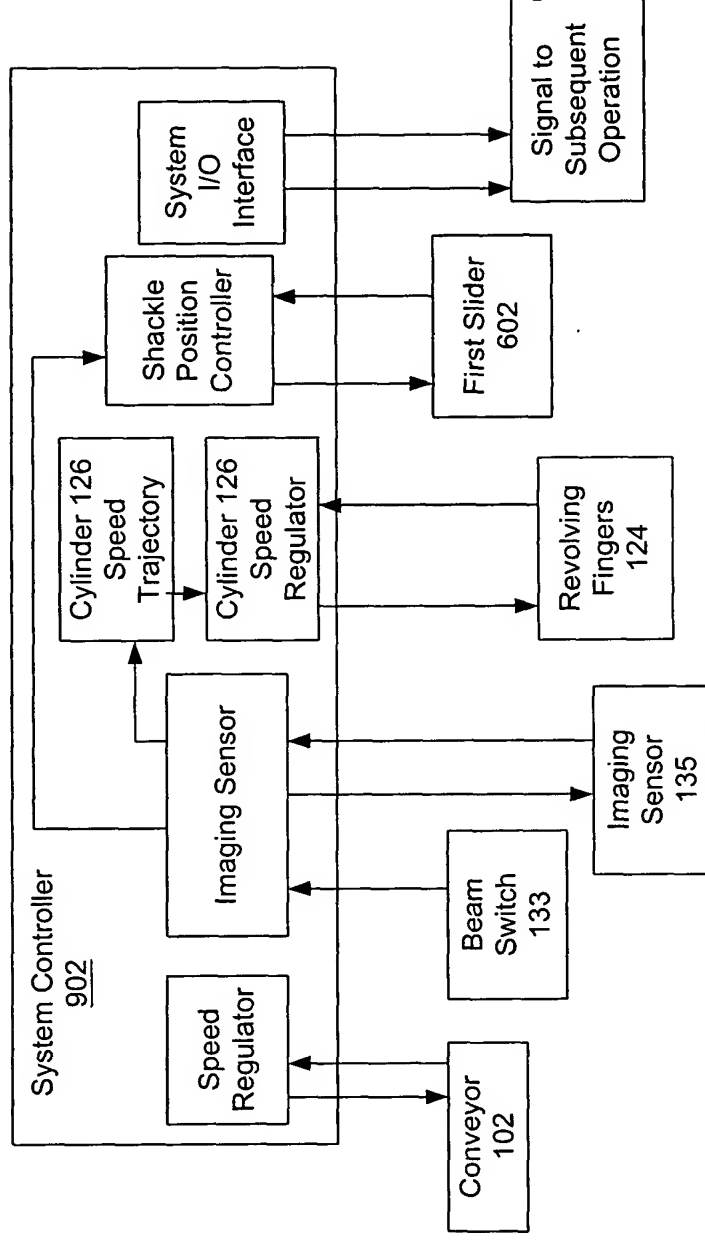


FIG. 10

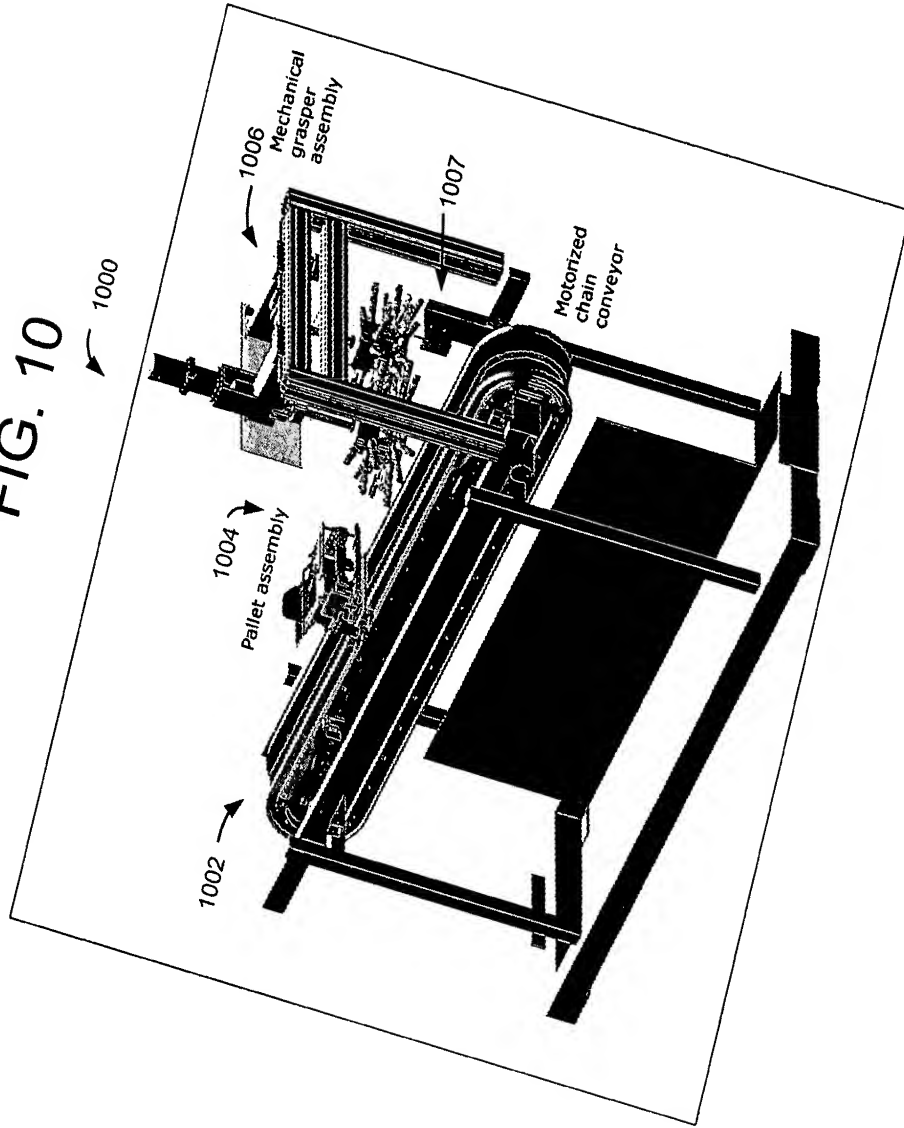
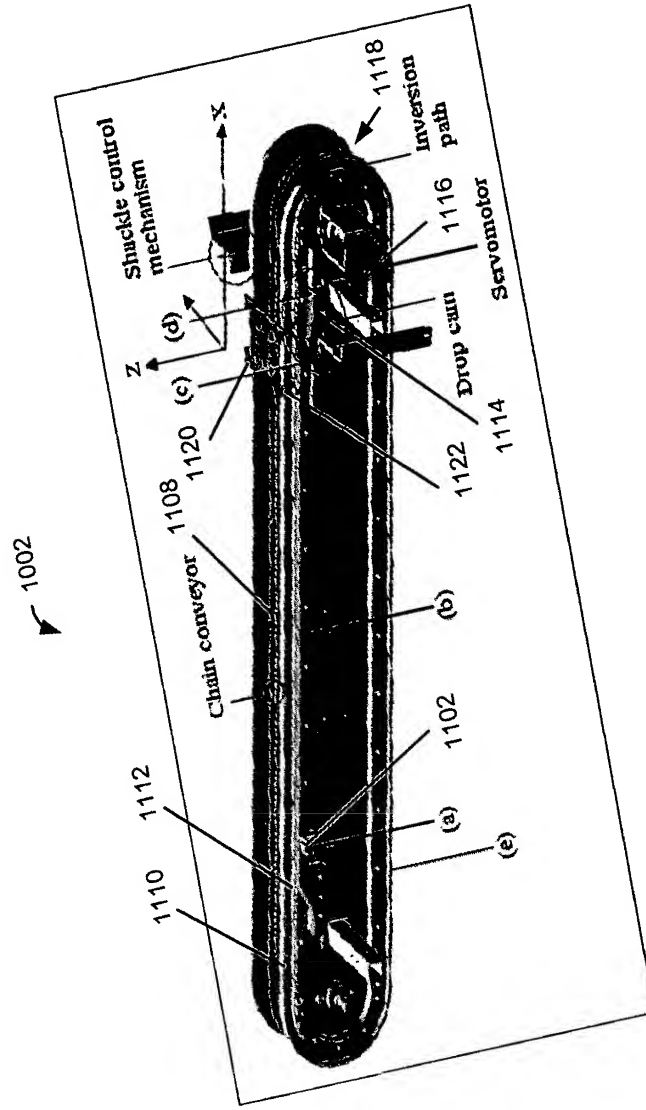


FIG. 11



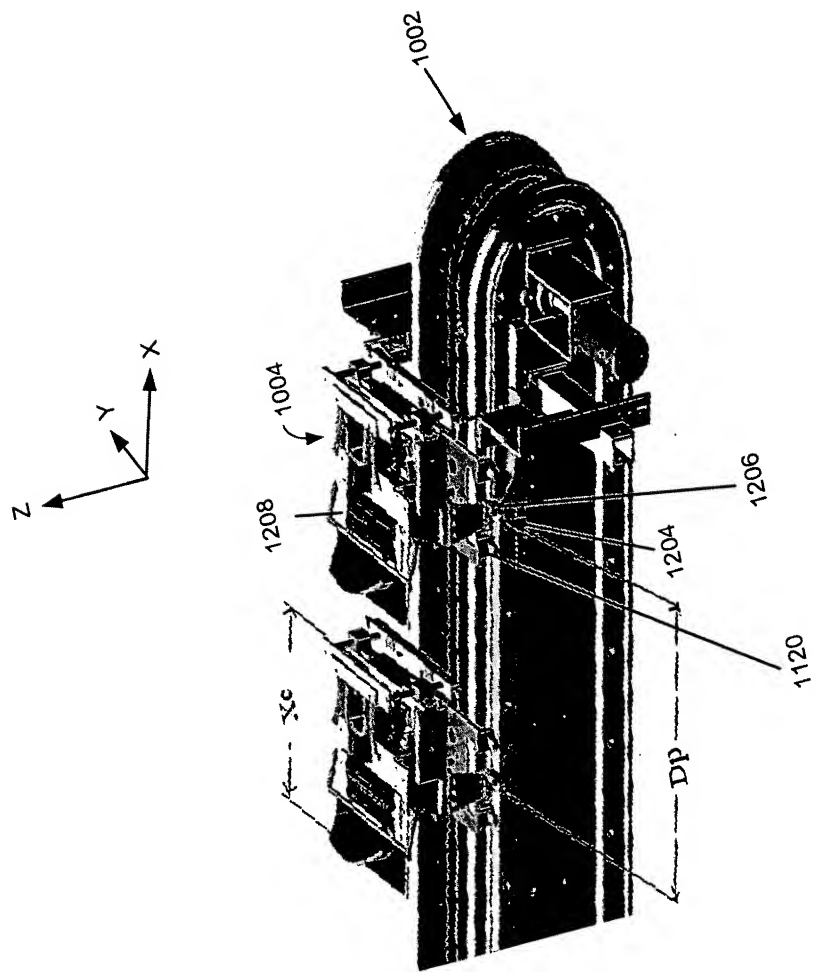


FIG. 12

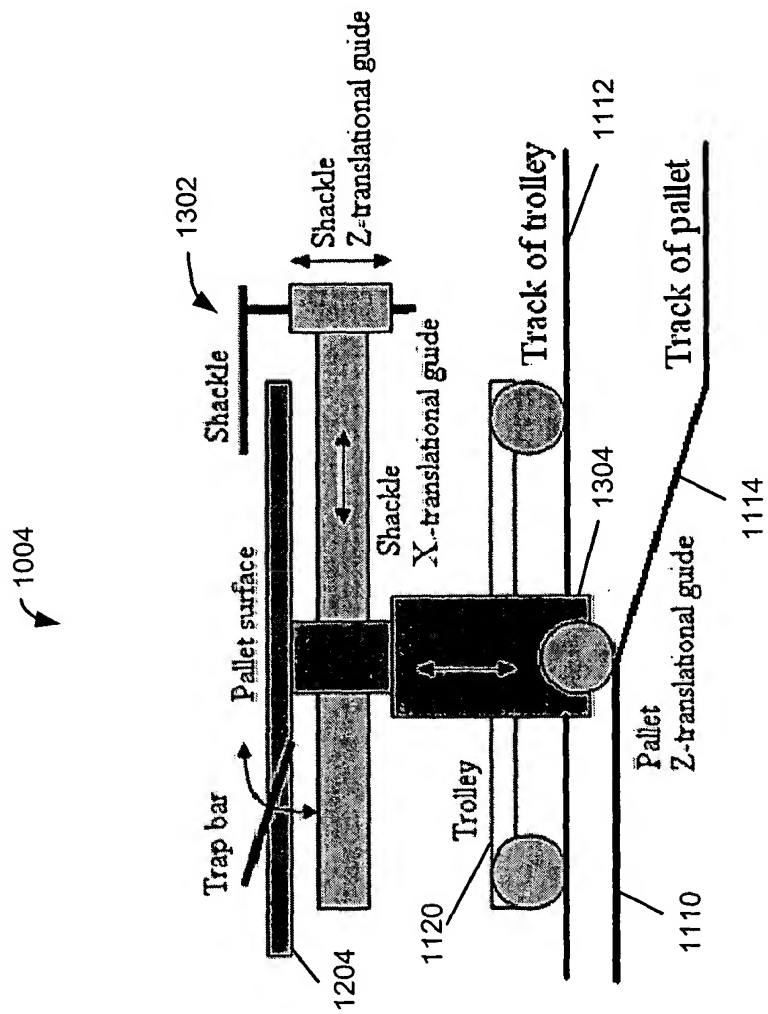


FIG. 13A

FIG. 13B

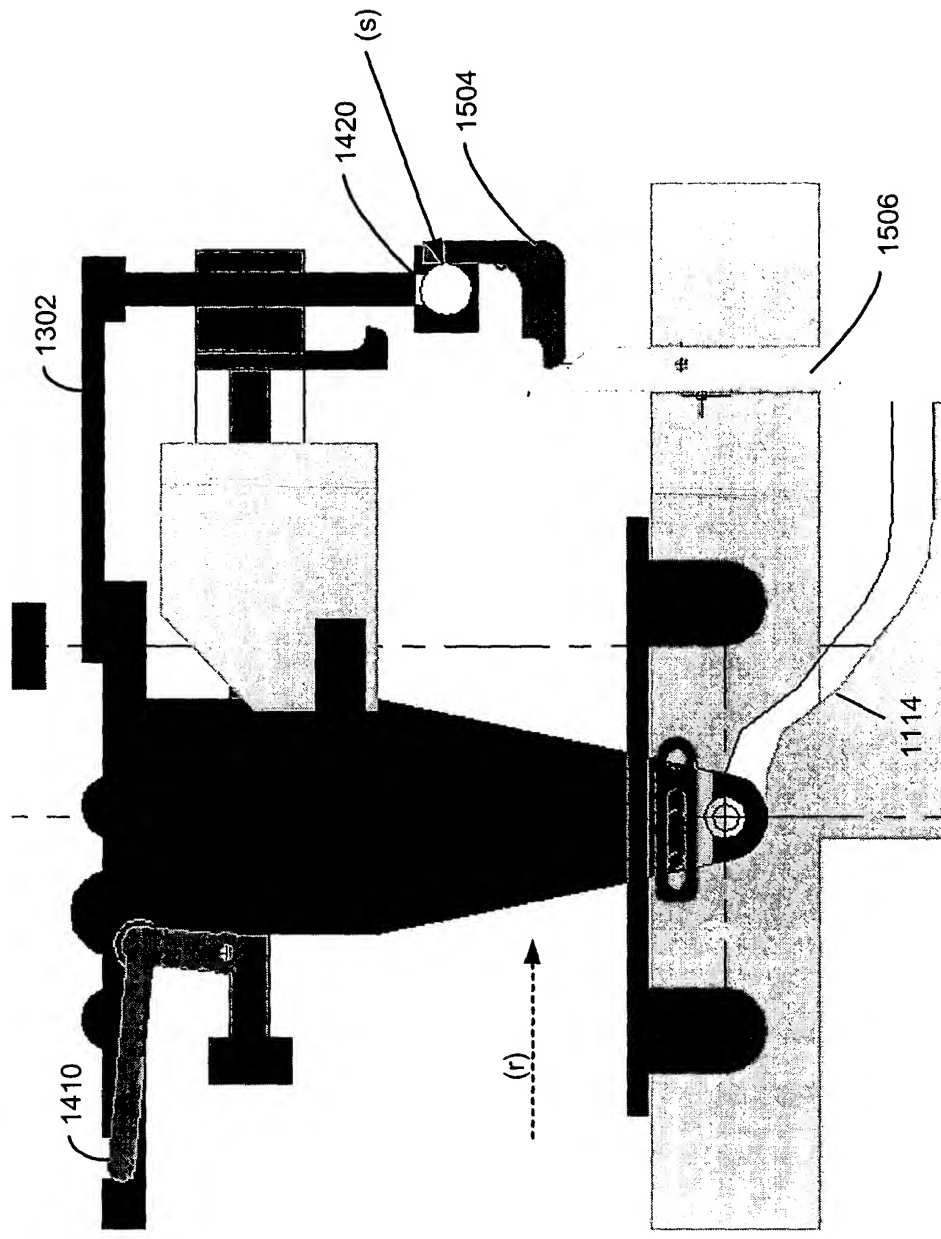


FIG. 13C

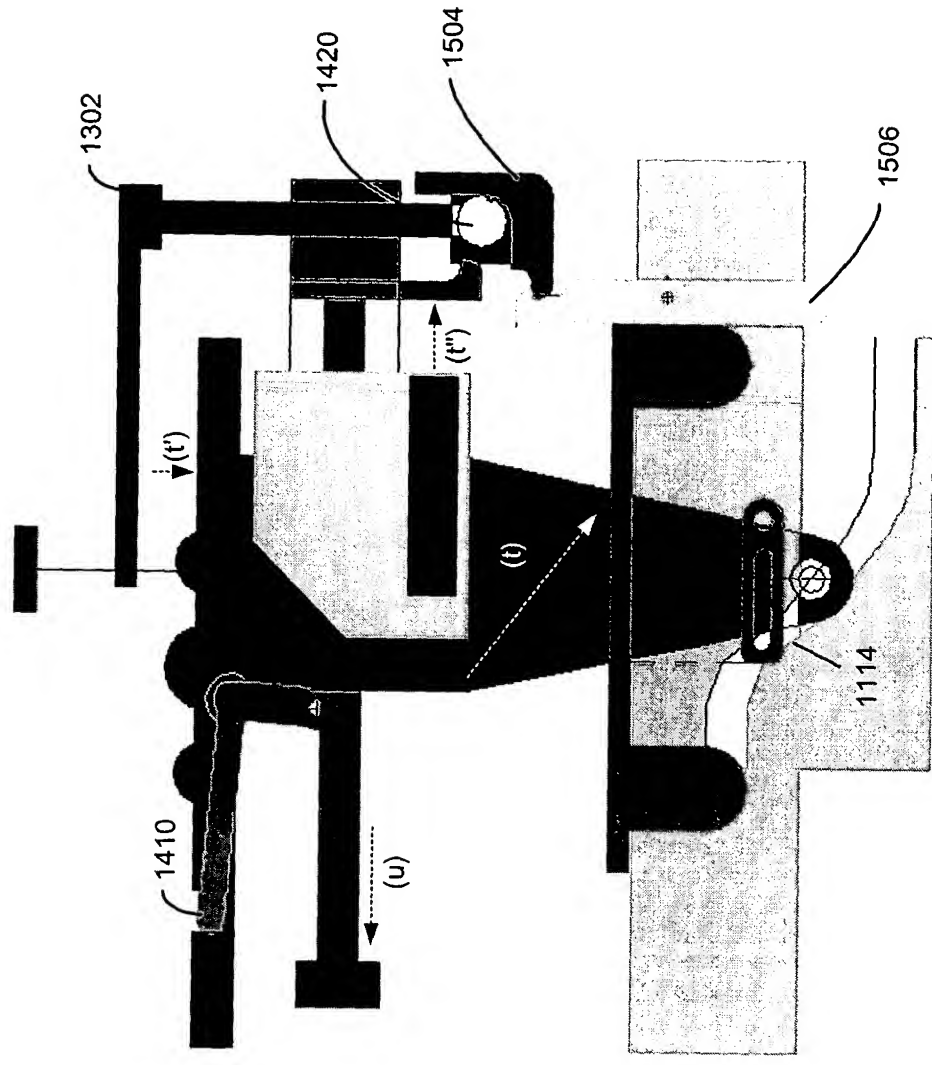


FIG. 13D

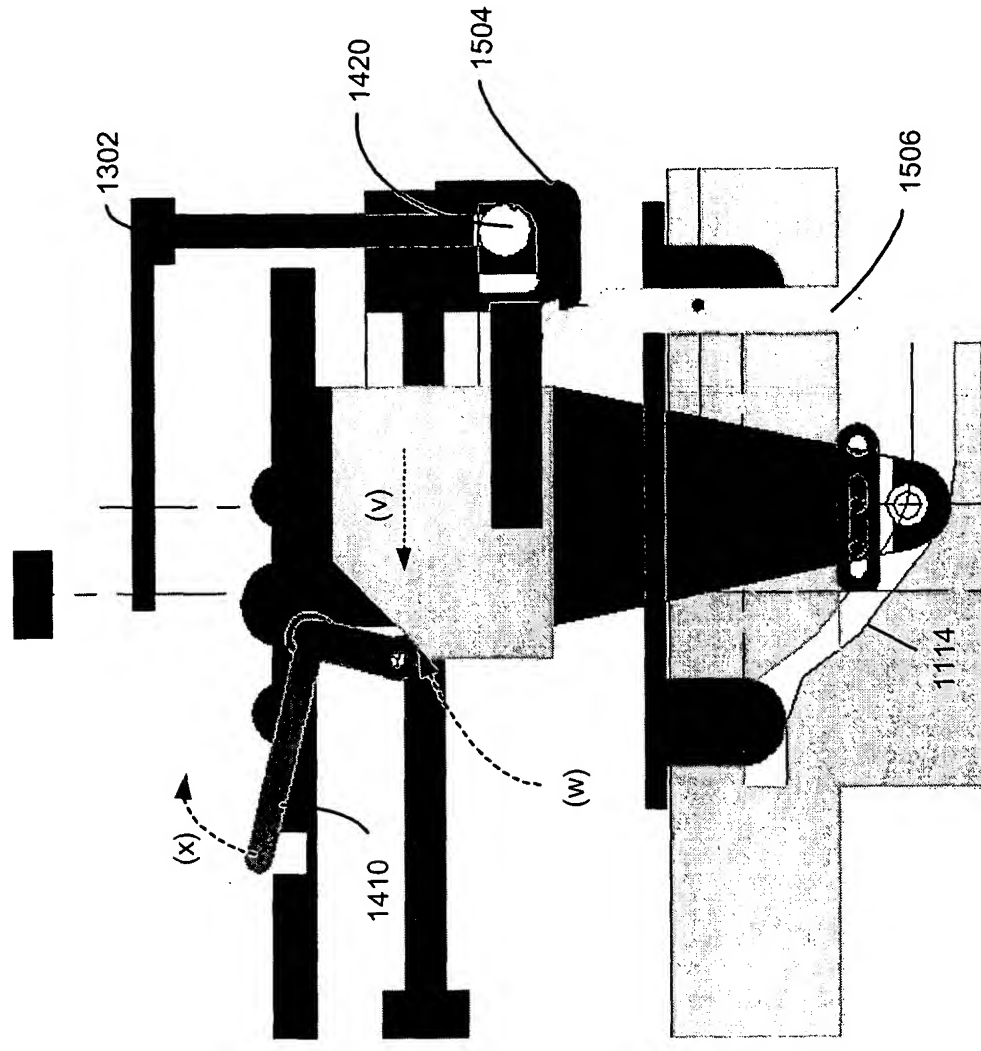


FIG. 13E

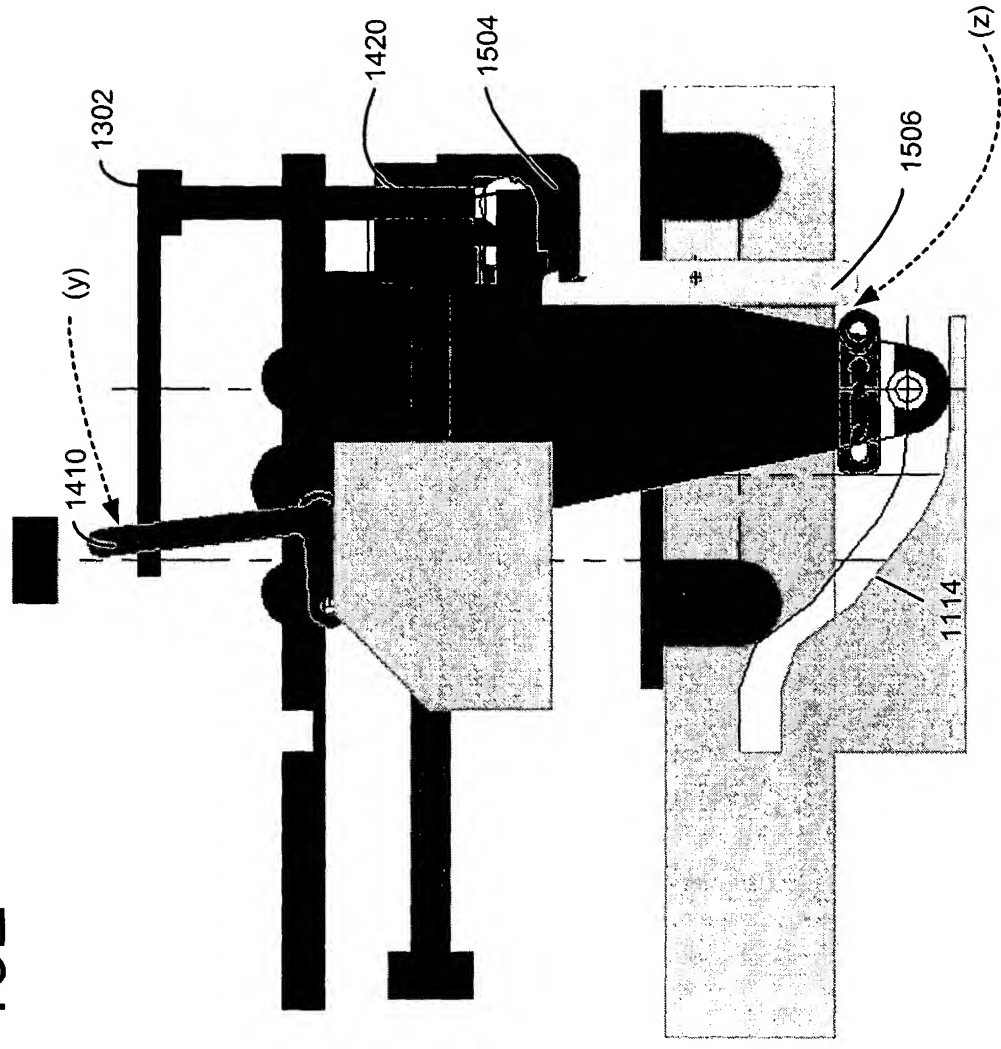


FIG. 14A

This exploded perspective view illustrates the assembly of a pallet system. The main components shown are:

- Pallet assembly (1204):** The central horizontal structure, including a base plate (1405) and a top plate (1406).
- Shackle Assembly (1302):** Located at the front, it includes a shackle (1414), a pin (1418), and a nut (1420).
- Shackle lock-and-release mechanism (1404):** A component that interfaces with the shackle assembly, featuring a lock (1415) and a release (1417).
- Trap-bar assembly (1402):** A long, angled bar (1410) with a handle (1421) and a foot (1409).
- Trolley (1120):** A wheeled support structure (1304) with a frame (1407) and a wheel (1206).

Various other parts and sub-assemblies are labeled with reference numerals: 1408, 1409, 1411, 1421, 1402, 1410, 1406, 1405, 1407, 1304, 1206, 1412, 1413, 1419, 1416, 1414, 1418, 1420, 1417, 1415, and 1430. Dashed lines indicate the assembly path and alignment of the components.

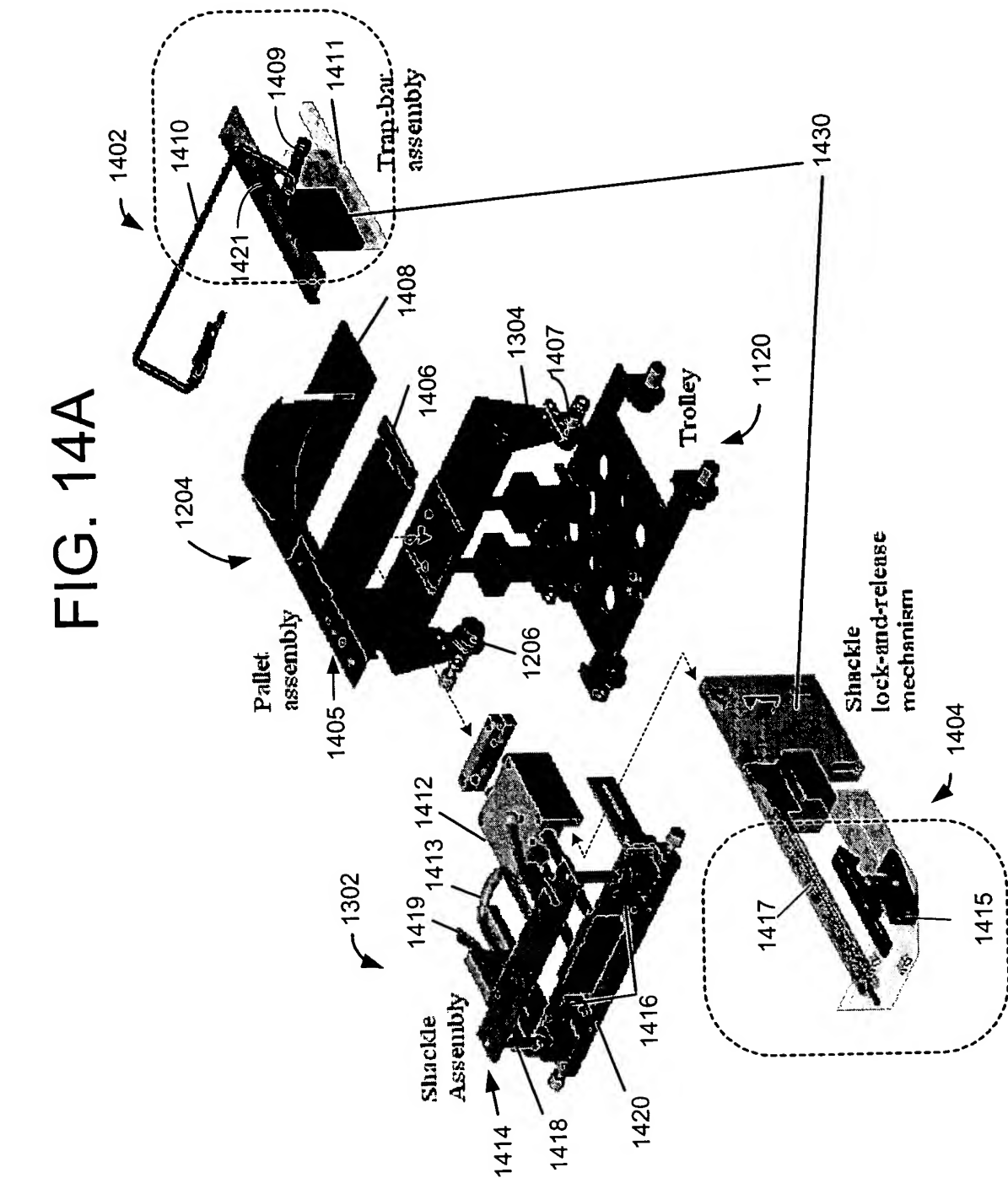


FIG. 14B

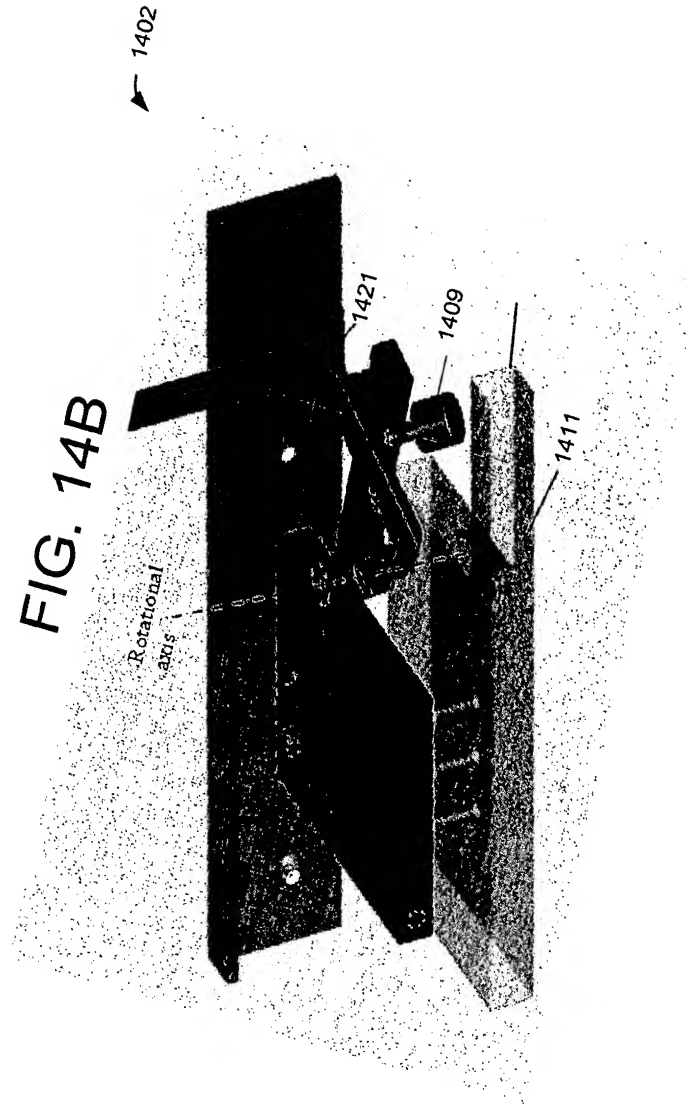


FIG. 14C

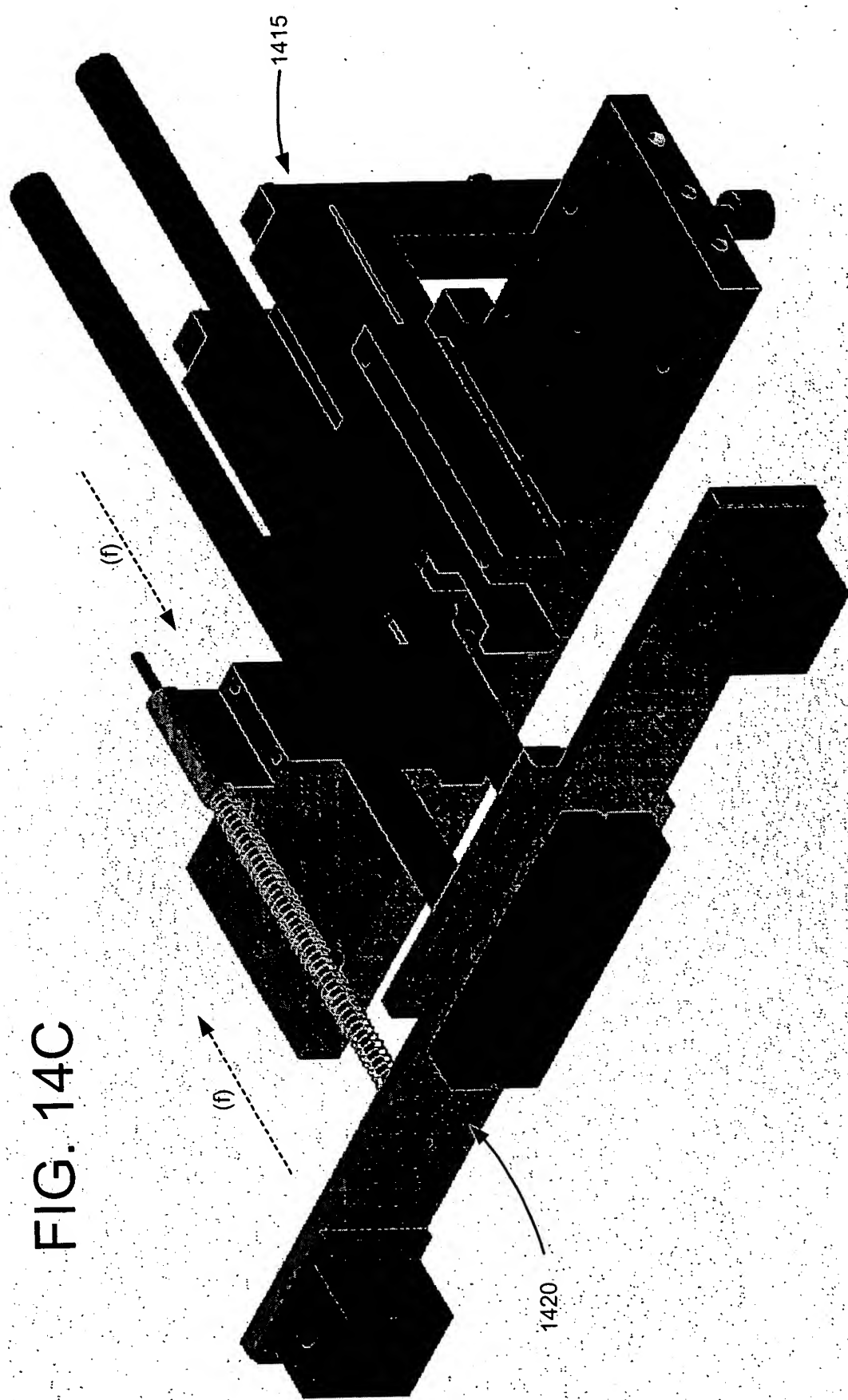
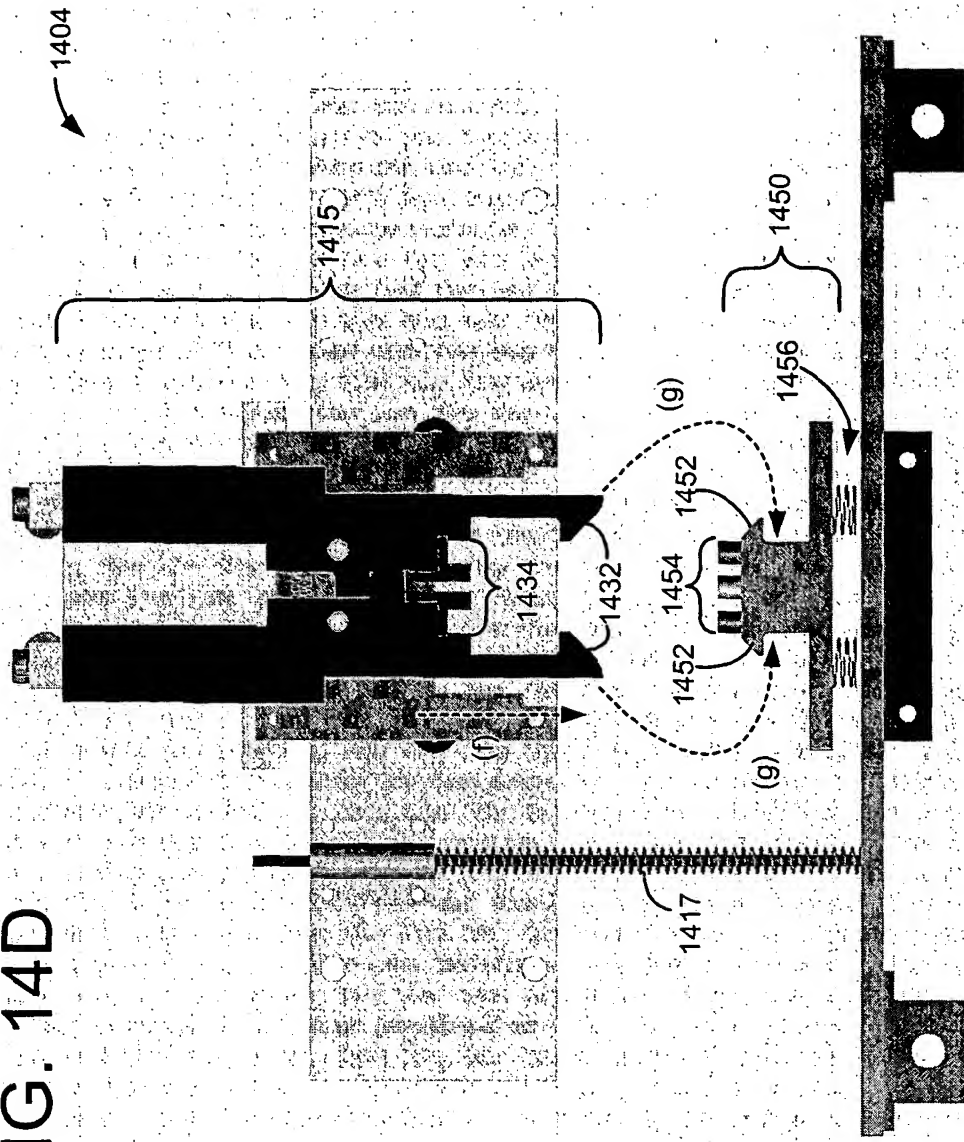


FIG. 14D



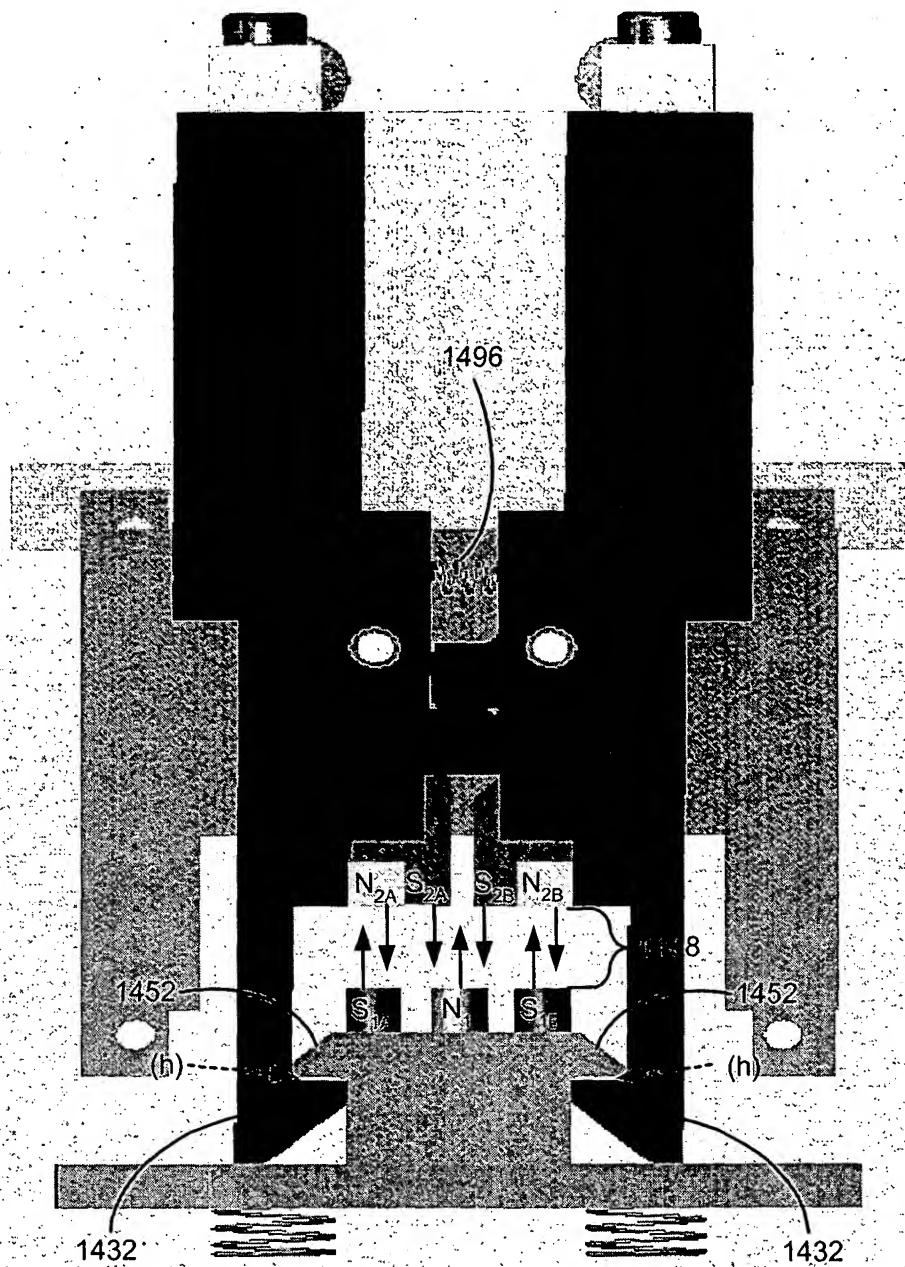


FIG. 14E

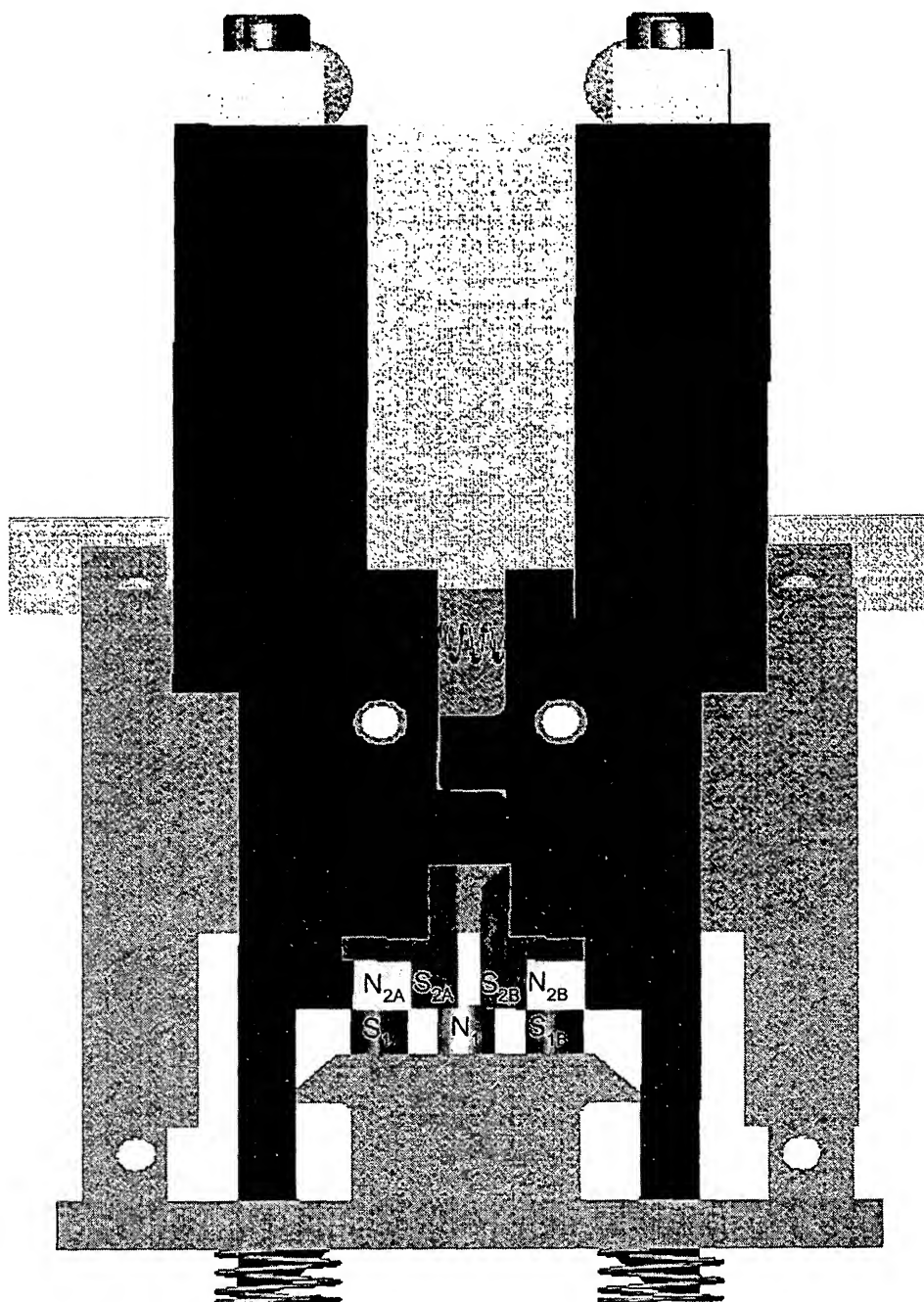


FIG. 14F

FIG. 14G

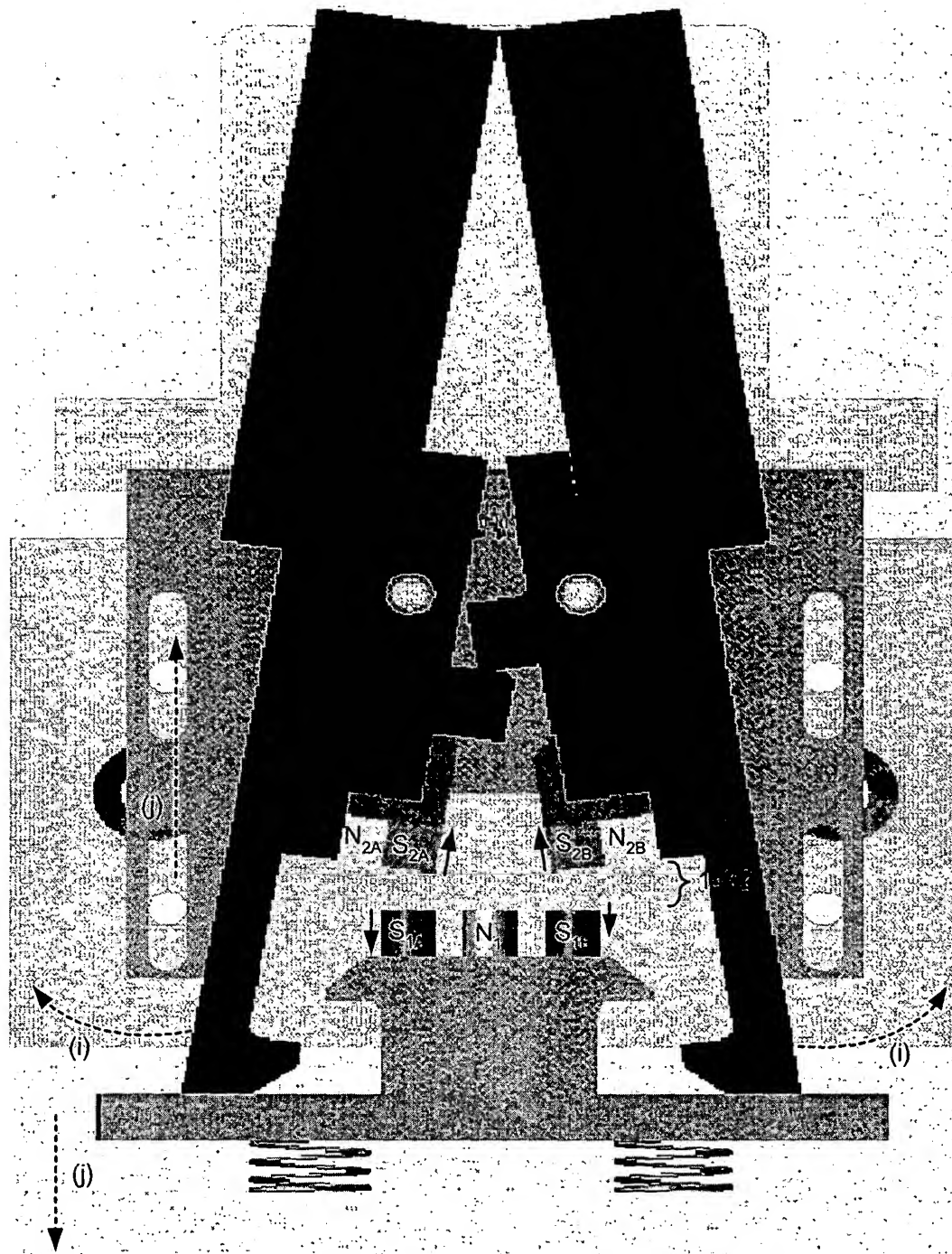
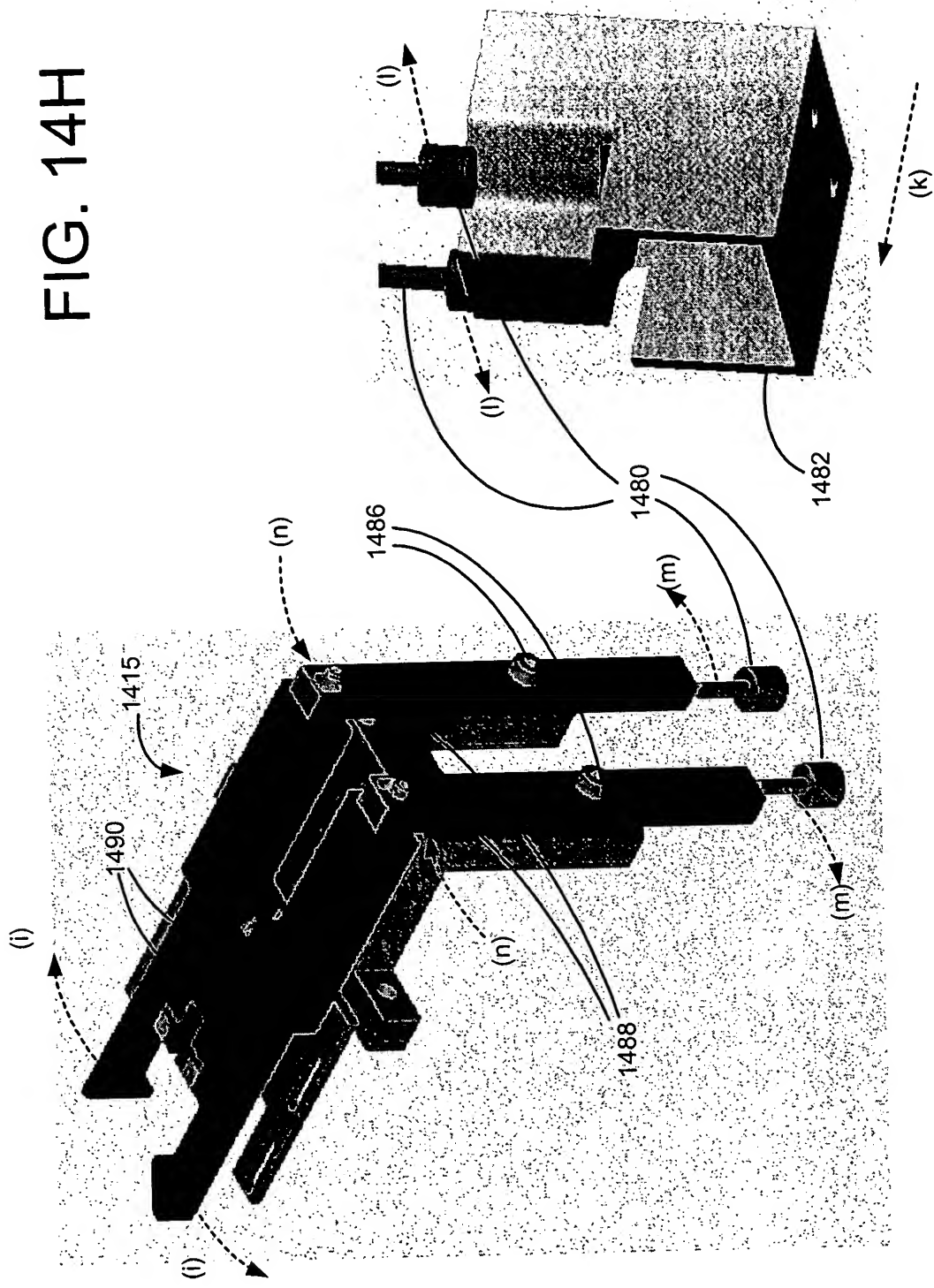


FIG. 14H



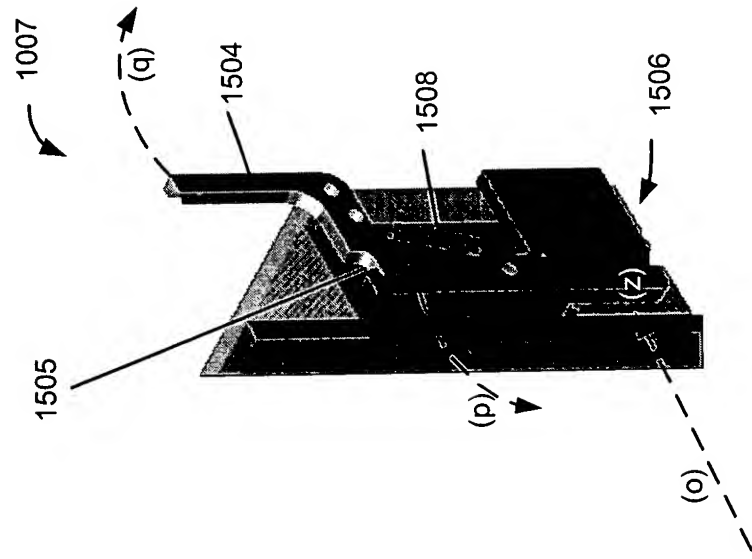


FIG. 15

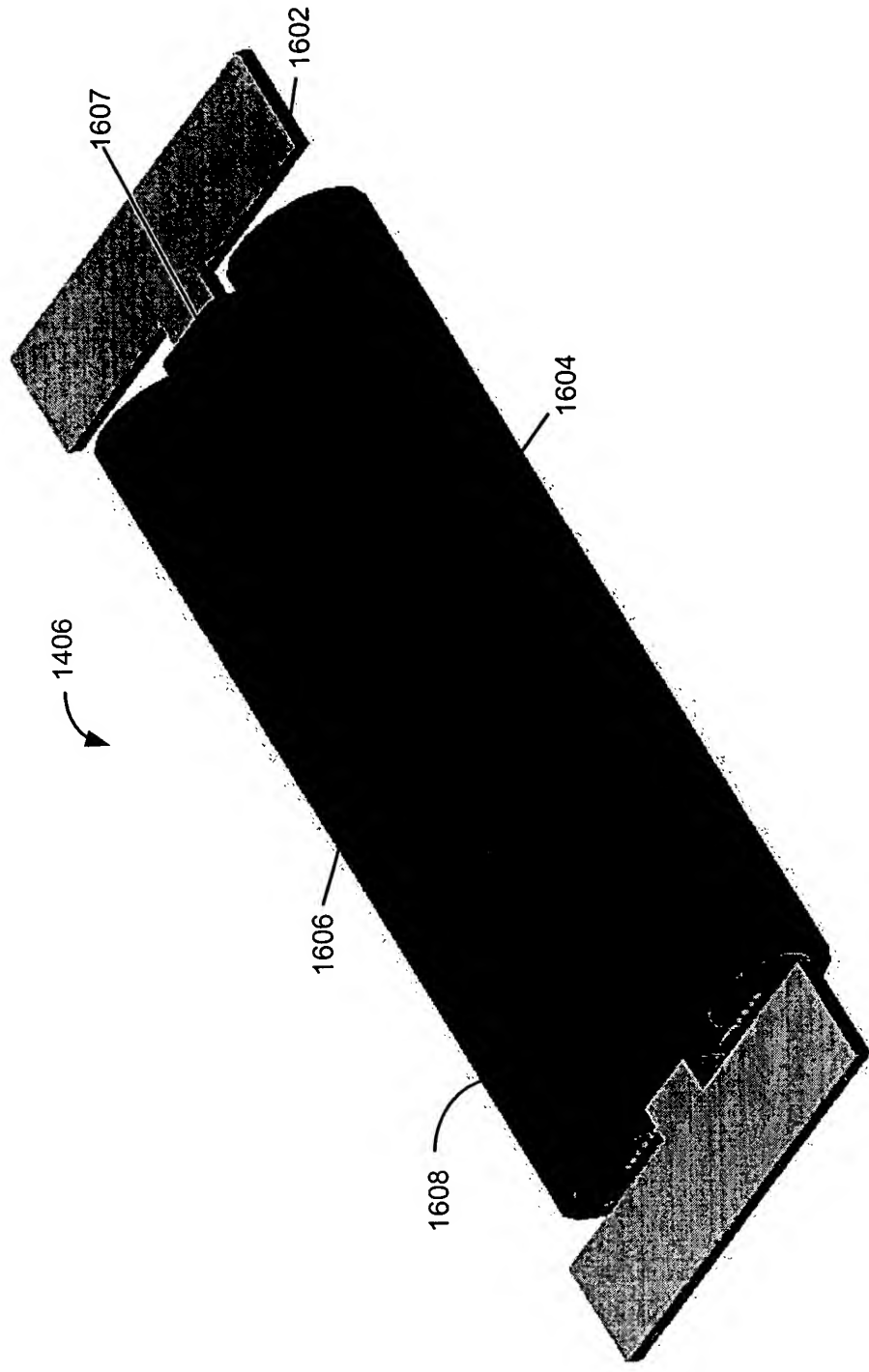


FIG. 16

FIG. 17

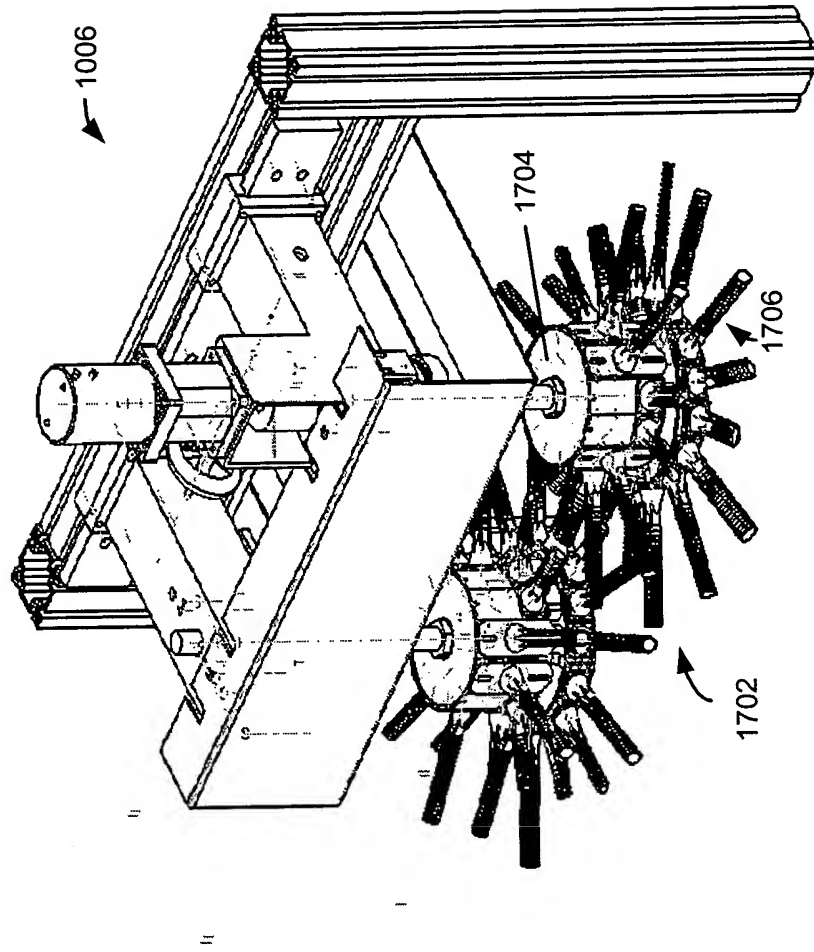


FIG. 18

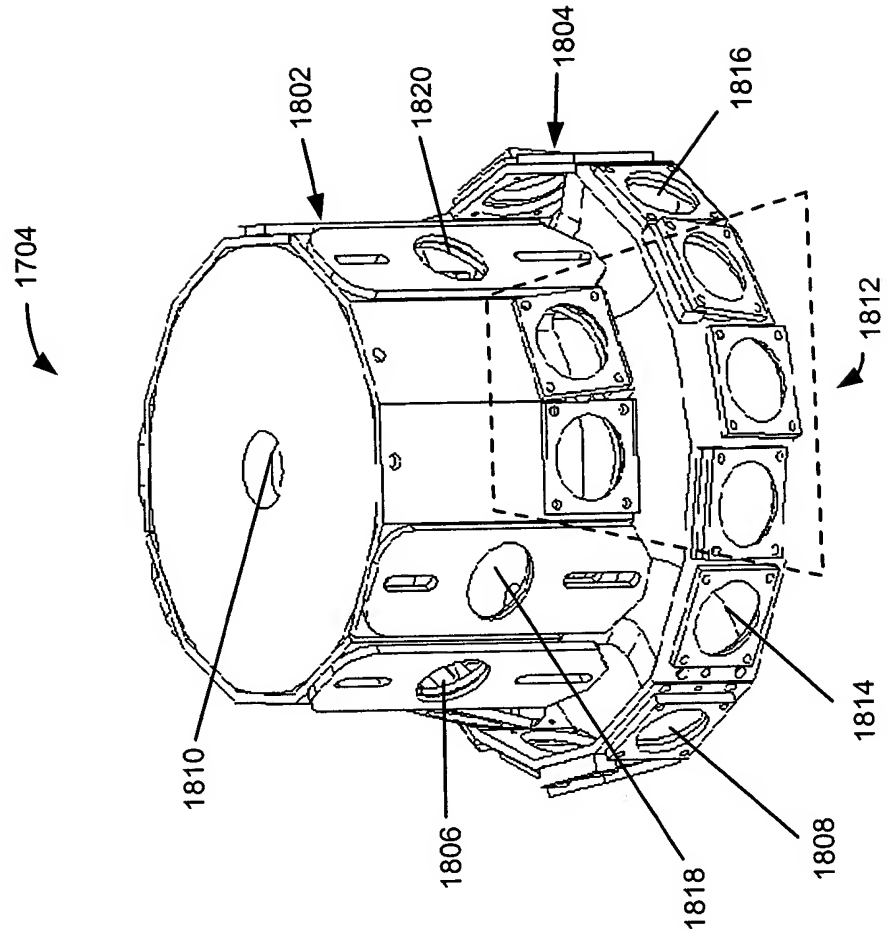
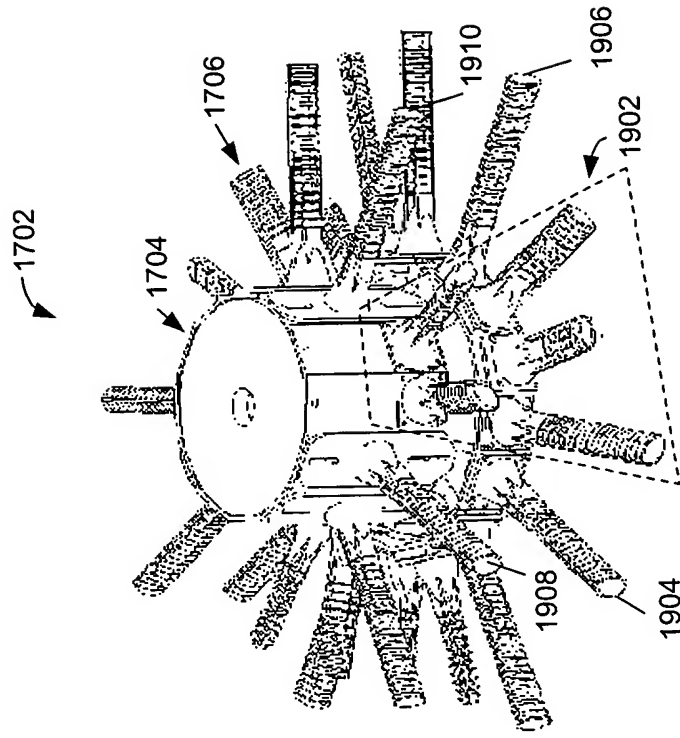


FIG. 19



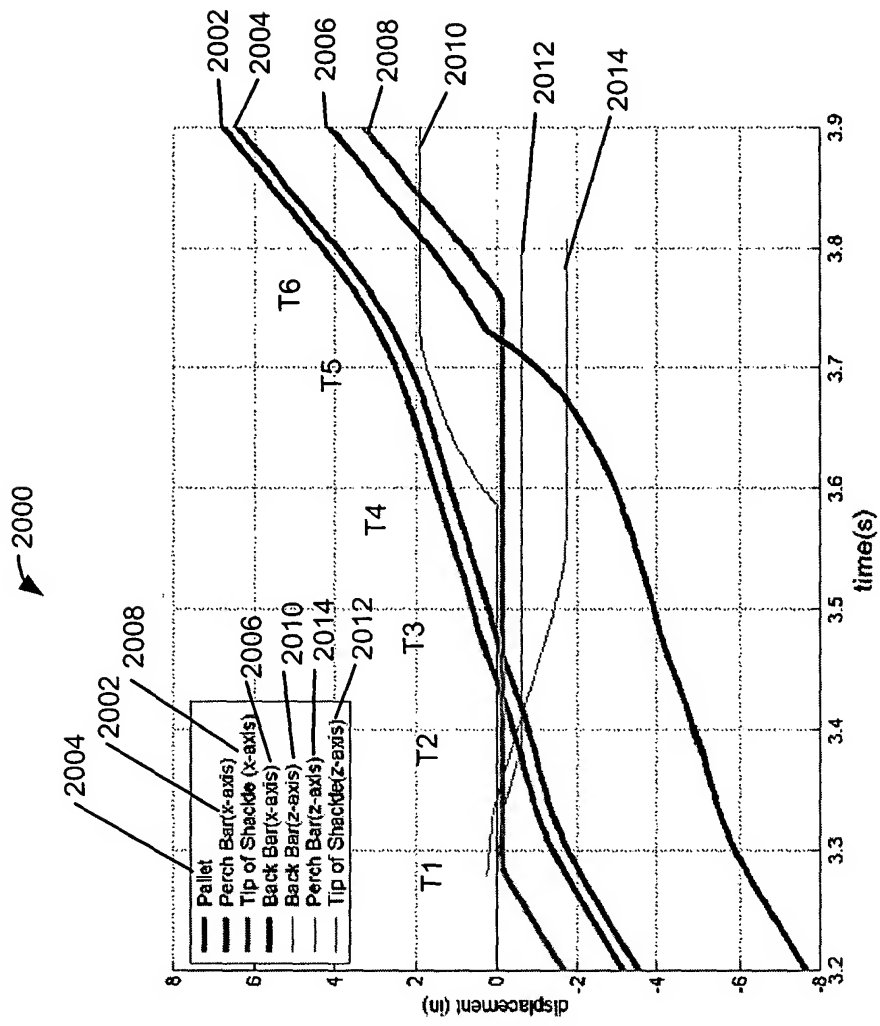


FIG. 20

FIG. 21

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